



## 1.5 – Systems software

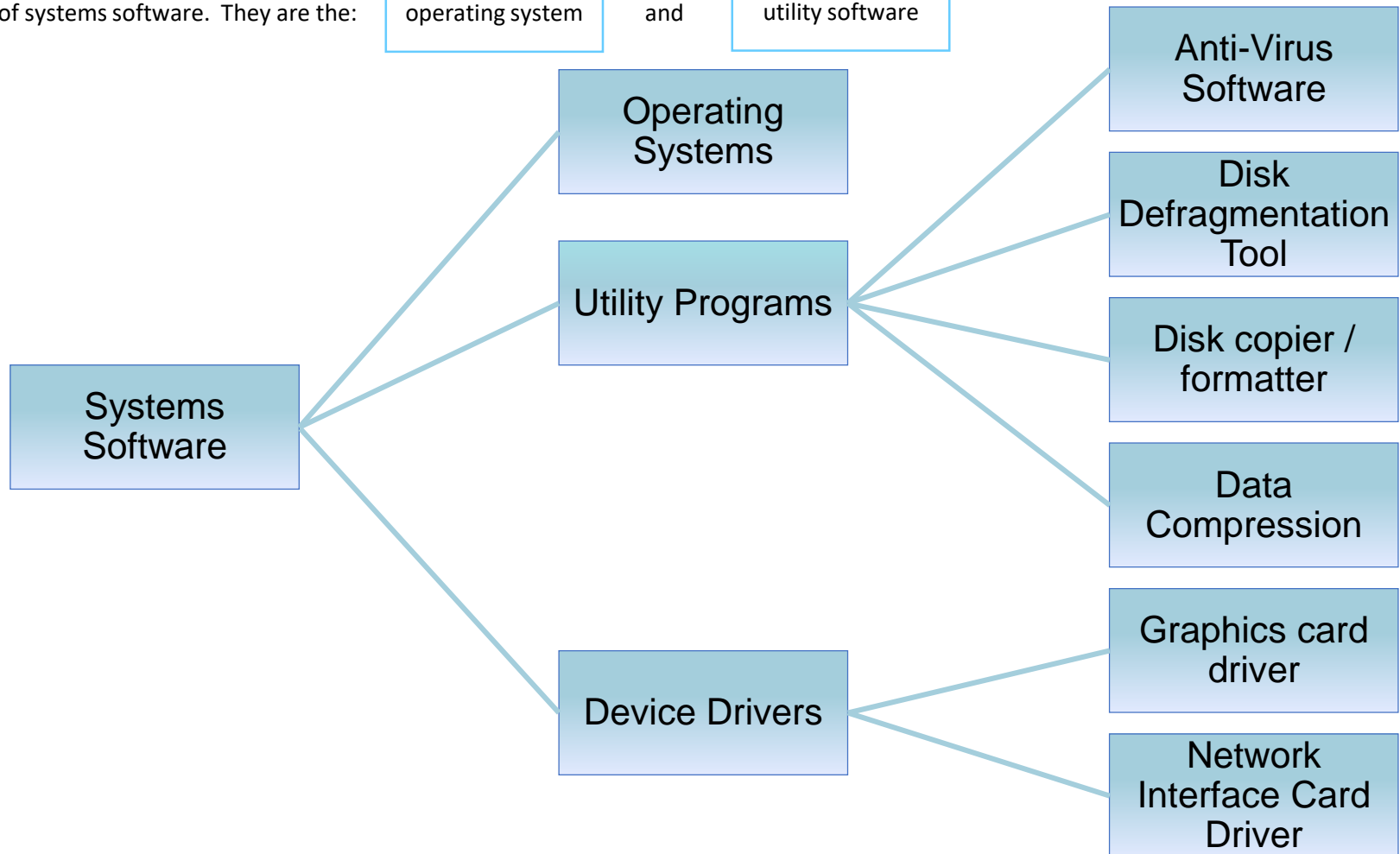
Sub topic	Guidance
<h3>1.5.1 Operating systems</h3>	
<ul style="list-style-type: none"> <li>□ The purpose and functionality of operating systems:                             <ul style="list-style-type: none"> <li>○ User interface</li> <li>○ Memory management and multitasking</li> <li>○ Peripheral management and drivers</li> <li>○ User management</li> <li>○ File management</li> </ul> </li> </ul>	<p><b>Required</b></p> <ul style="list-style-type: none"> <li>✓ What each function of an operating system does</li> <li>✓ Features of a user interface</li> <li>✓ Memory management, e.g. the transfer of data between memory, and how this allows for multitasking</li> <li>✓ Understand that:                             <ul style="list-style-type: none"> <li>▪ Data is transferred between devices and the processor</li> <li>▪ This process needs to be managed and what this entails (e.g. the use of buffers when transferring data to a printer)</li> </ul> </li> <li>✓ User management functions, e.g.:                             <ul style="list-style-type: none"> <li>▪ Allocation of an account</li> <li>▪ Access rights</li> <li>▪ Security, etc.</li> </ul> </li> <li>✓ File management, and the key features, e.g.:                             <ul style="list-style-type: none"> <li>▪ Naming</li> <li>▪ Allocating to folders</li> <li>▪ Moving files</li> <li>▪ Saving, etc.</li> </ul> </li> </ul> <p><b>Not required</b></p> <ul style="list-style-type: none"> <li>✗ Understanding of paging or segmentation</li> </ul>
<h3>1.5.2 Utility software</h3>	
<ul style="list-style-type: none"> <li>□ The purpose and functionality of utility software</li> <li>□ Utility system software:                             <ul style="list-style-type: none"> <li>○ Encryption software</li> <li>○ Defragmentation</li> <li>○ Data compression</li> </ul> </li> </ul>	<p><b>Required</b></p> <ul style="list-style-type: none"> <li>✓ Understand that computers often come with utility software, and how this performs housekeeping tasks</li> <li>✓ Purpose of the identified utility software and why it is required</li> </ul>



## The purpose and functionality of systems software

The purpose of the systems software is to: provide a platform on which users can run programs to accomplish tasks, and maintain the computer system.

There are two types of systems software. They are the: operating system and utility software





**User Interface** The user interacts with the computer system through Command Line Interface or Graphical User Interface.

## Graphical user interface (GUI):

- Windows
- Icons
- Menus
- Pointers
- Easy to use
- Visual
- Intuitive
- Optimised for mouse or touch gesture input.



## Command-Line Interfaces

- Text based.
- Less resource heavy than a GUI.
- For advanced users.
- Efficient.
- More commands than a GUI.
- Automate processes using scripts.
- E.g. DOS, Raspbian (for Raspberry Pi)

```
Directory of C:\Users\Anujkumar\Downloads
6-06-2013 04:15 <DIR> .
6-06-2013 04:15 <DIR> .
3-05-2013 19:35 <DIR> AUTODESK_AUTOCAD_U2014_WIN64-ISO
7-05-2013 11:48 <DIR> BioShock PC full game ^^nosTEAM^^
5-06-2013 05:22 1,119,375,368 EXCH201064.ISO
4-05-2013 14:55 <DIR> Far Cry PC full game ^^nosTEAM^^
4-05-2013 13:42 <DIR> Halo 2 [DRSAM]
1-06-2013 04:15 <DIR> iMovie 08
6-06-2013 04:10 <DIR> iPhoto 08
3-06-2013 22:25 <DIR> Microsoft Exchange Server 2003 Enterprise
2-06-2013 01:59 <DIR> Need For Speed The Run
5-06-2013 20:36 263,927 NSD 2.0.rar
5-06-2013 20:36 172,412 nsd 3.0.rar
7-05-2013 21:08 <DIR> SB459H Super Mario Galaxy 2
7-05-2013 11:47 <DIR> Sonic.Adventure.2-RELOADED
4-06-2013 04:48 1,021,900,000 The King Of Fighters (2010) DvdRip [Kvoid] (1
372) x.avi
1-06-2013 21:02 <DIR> Windows Server R2 2003 Standard Edition SP2
64 - Volume License
 4 File(s) 2,141,712,499 bytes
 13 Dir(s) 120,928,038,912 bytes free

C:\Users\Anujkumar\Downloads>dir halo*.
Volume in drive C has no label.
Volume Serial Number is 5809-6342

Directory of C:\Users\Anujkumar\Downloads
4-05-2013 13:42 <DIR> Halo 2 [DRSAM]
 0 File(s) 0 bytes
 1 Dir(s) 120,928,038,912 bytes free
```



## Memory management: multi-tasking

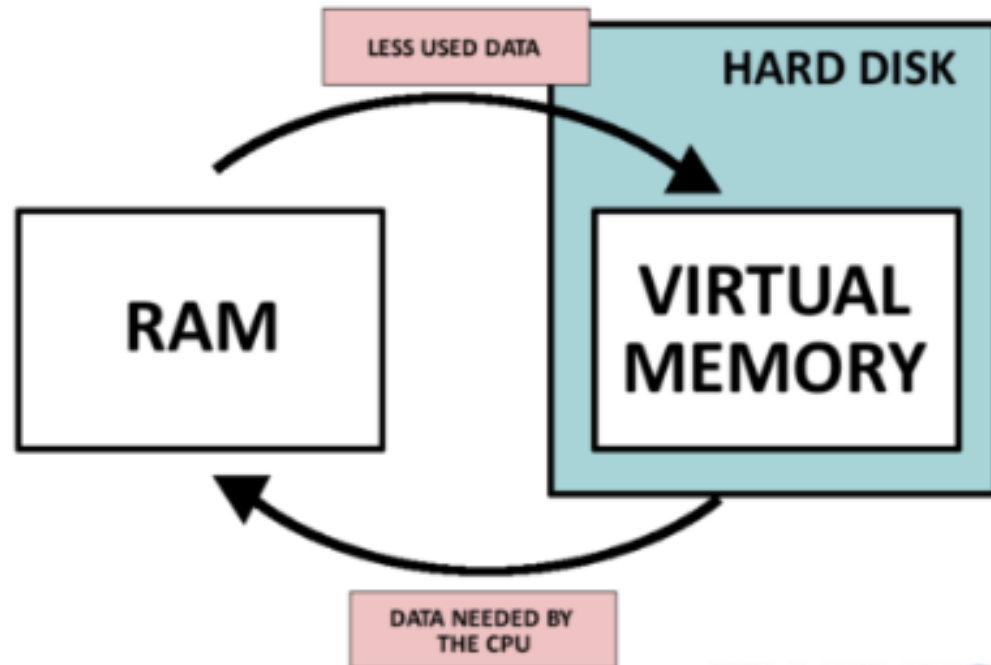
Multi-tasking is:

running multiple applications at the same time by giving each a small time-slice of processor time.

The OS allocates memory between the different programs that are open at the same time

Programmers and users do not need to know where in memory data is being held – it is the purpose of the Operating System to do this

Memory manager moves programs between virtual memory and RAM



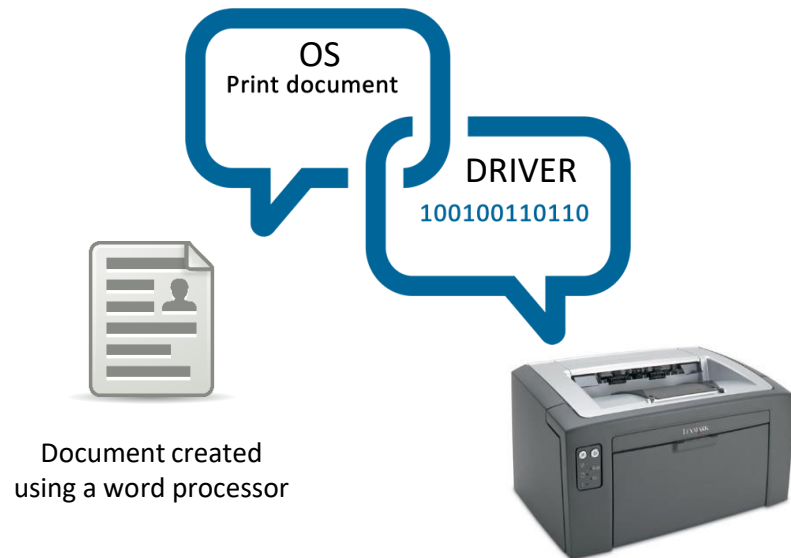


## Peripheral management and drivers

Operating Systems manage the way in which hardware interacts with software.

A peripheral is a piece of hardware that is not directly connected to the CPU – such as a keyboard, a mouse or even a hard disk drive.

An Operating System managed all of the peripheral devices that are connected to the computer – this allows them to be disabled, or drivers be updated.



A laser printer attracts toner particles to magnetised areas of the paper. Heat is used to fuse the toner to the page.



An Inkjet printer sprays different coloured inks onto the page one row at a time.

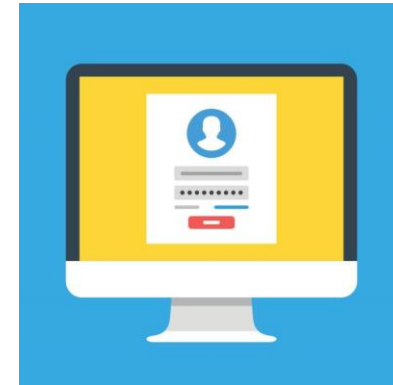
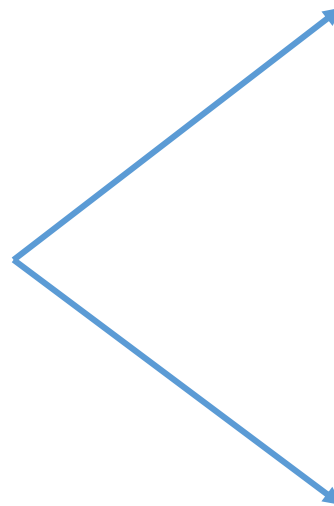


## User management

Controls which users, and how many users, can access the computer system.

Grants users access to specific data and resource eg. Their own personal data and account, but not that of other users.

Uses anti-theft measures to prevent access for other users eg. Password or pin protection.





## File & Disk management

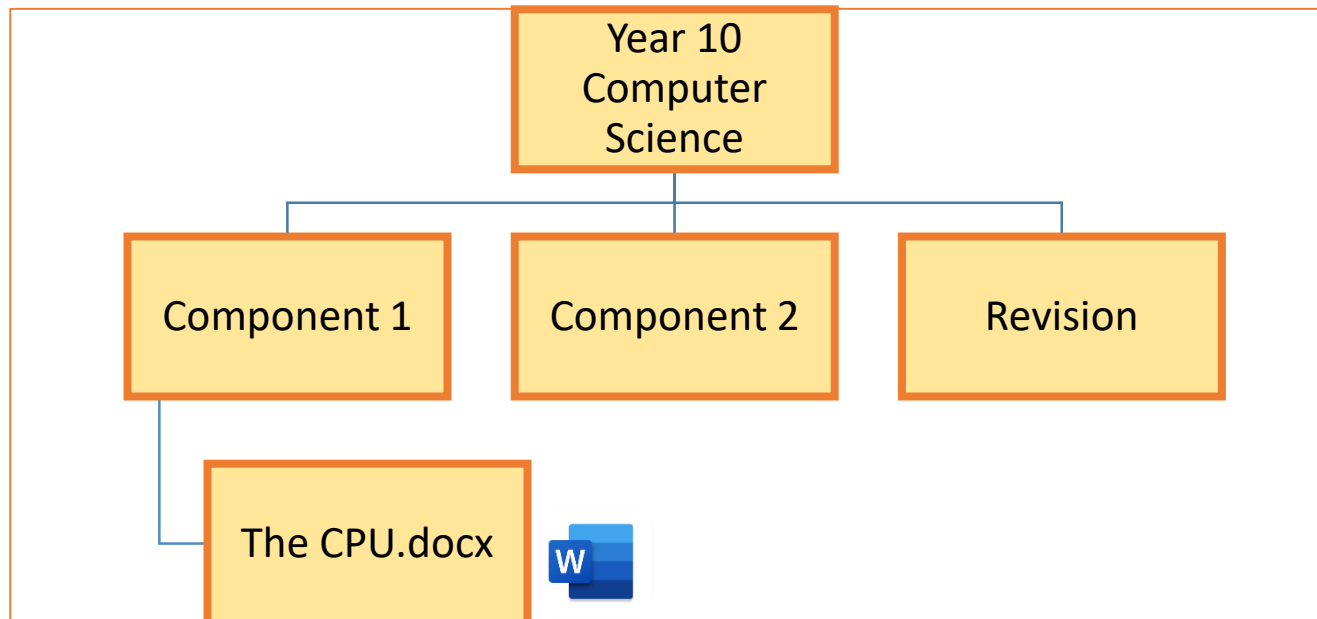
Like memory management, the Operating System must identify where files are stored for long term storage on for e.g. the hard disk drive or a solid state drive.

Organises files into hierarchical structure of folders.

Deals with naming, saving, moving, editing and deleting files and folders.

Splits the hardisk into sectors and decides where files are written to.

Maintains the hard disk with utility software.



The OS uses extension to match files with apps.



## 1.5 – Systems software

### Sub topic

### Guidance

#### 1.5.1 Operating systems

- The purpose and functionality of operating systems:
  - User interface
  - Memory management and multitasking
  - Peripheral management and drivers
  - User management
  - File management

#### Required

- ✓ What each function of an operating system does
- ✓ Features of a user interface
- ✓ Memory management, e.g. the transfer of data between memory, and how this allows for multitasking
- ✓ Understand that:
  - Data is transferred between devices and the processor
  - This process needs to be managed and what this entails (e.g. the use of buffers when transferring data to a printer)
- ✓ User management functions, e.g.:
  - Allocation of an account
  - Access rights
  - Security, etc.
- ✓ File management, and the key features, e.g.:
  - Naming
  - Allocating to folders
  - Moving files
  - Saving, etc.

#### Not required

- \* Understanding of paging or segmentation

#### 1.5.2 Utility software

- The purpose and functionality of utility software
- Utility system software:
  - Encryption software
  - Defragmentation
  - Data compression

#### Required

- ✓ Understand that computers often come with utility software, and how this performs housekeeping tasks
- ✓ Purpose of the identified utility software and why it is required





# J277 - 1.5 Systems software

## The purpose and functionality of Utility system software

Utility:

**Encryption**

**Defragmentation**

**Data compression**

**Backup**

Purpose

Encryption means to scramble data in a way that it is unreadable to anybody who doesn't have a key to be able to unscramble this.

Data is encrypted using a key and then decrypted using a key

Data is encrypted so that it is unreadable if anyone is to intercept it

When a hard disk drive is new – files get added onto the disk in order.

As files are deleted – this leaves gaps.

When new files are saved – the files fill the gaps and become fragmented.

Defragmentation software groups fragmented files back together.

Reducing the size of the file by performing an algorithm on the original data.

Compressed files take up less disk space and are quicker to download.

Compressed files need to be extracted before they can be used.

Backup software takes a copy of files to protect against data loss and malware attacks.

Backups can either be full backups where every file is copied, or incremental where only the files that have changed since the last backup are copied.

Example:

